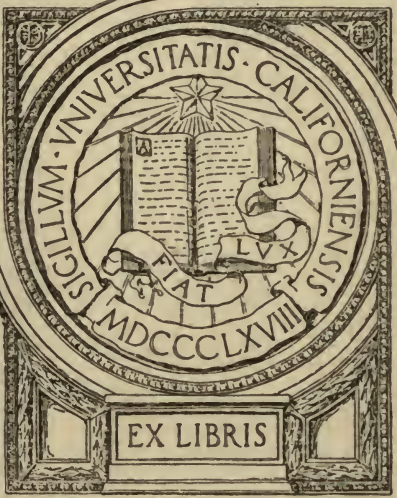
EXCHANGE



EDUC.
LIBRARY

Digitized by the Internet Archive
in 2007 with funding from
Microsoft Corporation

http://www.archive.org/details/comparisonofelem00milerich

EXCHANGE
DEC 9 1913

STUDIES IN EDUCATION

FROM THE

DEPARTMENT OF EDUCATION

OF

THE STATE UNIVERSITY OF IOWA

VOLUME I NO. 1

Iowa. University.
"University of Iowa studies in

UNIV. OF CALIFORNIA

BULLETIN OF THE STATE UNIVERSITY OF IOWA

NEW SERIES NO. 19 MARCH 11, 1911

IN THE SERIES OF RESEARCH BULLETINS OF THE UNIVERSITY

STUDIES IN EDUCATION

FROM THE

DEPARTMENT OF EDUCATION

OF

THE STATE UNIVERSITY OF IOWA

Professor Frederick Elmer Bolton, Ph.D., Editor

VOLUME I NUMBER 1

CONTENTS

A comparison of elementary and high school grades
Walter R. Miles
(Reprinted from the Pedagogical Seminary, December 1, 1910)

PUBLISHED BY THE UNIVERSITY

Issued Twenty-One Times During the Academic Year; Monthly From October to January, Weekly from February to June. Entered at the Post Office as Second Class Mail Matter

LB5
I8
v.1-2
EDUC.
LIBRARY

EXCHANGE

A COMPARISON OF ELEMENTARY AND HIGH SCHOOL GRADES[1]

By Walter R. Miles, M. A.

The marks or grades given by the elementary school, high school, college and university present many interesting problems from the point of view of educational psychology. For instance there is the question as to whether these marks are definitely related to the general mental traits, capacities and development of the individual who attains them. Then, there is the problem as to whether a given grade stands simply for a certain degree of static accomplishment or whether it is a measure of functioning capacity. We cannot speak with certainty upon these and many other points, but perhaps the most important step toward clearing them up will have been taken when a number of investigators have carefully worked over the data afforded by school marks.

For some purposes it may be satisfactory to gather the grades of a large number of pupils as they may rank in a single year, or semester. However, for more exact results it would certainly be better to gather material from the records of a smaller group whose work continues throughout a period of years.

Among the problems which may be investigated through students' records is that as to whether they maintain the same relative status or rank as they pass from one school to another. Professor W. F. Dearborn recently published a study of one phase of this problem in a monograph entitled "The Relative Standing of Pupils in the High School and in

---

[1] Reprinted from the *Pedagogical Seminary*, December, 1910.

640514

the University."[1] The primary object of our study is to make a similar investigation of the relationship between the elementary and high school grades.

The original plan was to obtain the elementary and high school records of at least 500 pupils and from these work out the correlations. Owing to the great amount of time necessary for getting together so much data and also to the differences which are sure to exist between schools, it was decided to use only that which could be obtained from the Iowa City school records.

PROBLEM

The main problem in this study has been to determine to what extent pupils in the high school maintain the relative rank which they held in the elementary or common school. In other words are the pupils who would be classed as good, average, and poor in the elementary school, good, average and poor respectively when judged on the basis of their high school work?

Closely connected with this is the similar problem relative to the specific subjects of study. What is the relationship between a pupil's elementary school ranking, for example, in arithmetic and his high school ranking in mathematics? Furthermore between what subjects are the correlations especially high?

In dealing with the above problems various other related questions, such as the factor of sex, the skipping of grades and retardation in the elementary school and the failures in subjects of study in the high school, presented themselves. These questions were investigated as far as the data afforded by this limited group would admit.

METHODS OF THE INVESTIGATION

It was necessary first to prepare a blank form suitable for purposes of gathering data.[2] These blanks were not used as a questionnaire but simply as means of helping the investigator to arrange the facts regarding each pupil in an orderly and convenient form. Not only were the marks carefully recorded in their appropriate columns but also facts regarding sickness, age and time of entrance were noted down.

In the data upon which this study is based only such records are included as show the completion on the part of the individual of at least the last four years of the elementary school and the first two years of the high school. This standard is arbitrary but owing to the natural inequalities which exist in marks it seemed well not to take account of records that were less complete. Many of the Juniors and Seniors of 1909-10 as well as a number from the graduating classes of the three or four previous years were therefore within the scope of this study. The group available, moreover, would have been much larger were it not for the fact that the records of the Iowa city schools have been preserved for only the last twelve years.

---

[1] *Bulletin of the University of Wisconsin*, No. 312; High School Series, No. 6, 1909.

[2] The gathering of the material for such a study from the usual school records is a very tedious task. A loose leaf school record system would, among many other advantages, make the data of grades much more accessible to those seeking light upon certain school problems.

These schools, in marking, employ the letters "E," "G," "M," "P," and "F" which stand for the terms "Excellent," "Good," "Medium," "Poor" and "Failure." The general numerical value connected with these letters is as follows: E 95–100, G 85–95, M 75–85, P 70–75 and F —. It was necessary for purposes of averaging the marks to adopt some one numerical value for each letter. The values adopted were: E 97.5, G 90, M 80, P 72.5, and F 60. The assigning of the value 60 to F is of course very arbitrary, but it is as fair for one as another, its only effect being to push upward to some extent those who have one or more F's.

In computing the individual's average elementary school grade all the marks received in his elementary school course were taken into account; similarly, all his high school marks were averaged to obtain his high school standing.

Some may object to including music, drawing and rhetoricals in such averages, but upon inspection of the group average grades in this subjects one sees no good reason why they should be omitted. (See table No. 1.)

This table not only presents the group average grades for the various elementary and high school subjects with the average decline between the elementary and high school grades, but there is another important detail of method. Many with whom the author has talked have expressed the opinion that the marking of the first four years in the elementary school is much less discriminative than that of the last four years. If this were true it would, perhaps, be better not to include the former marks in such an investigation. All but two of the individuals in our group furnished more or less complete records for these first four years in the elementary school. From this data we find that the difference between the average for the whole elementary course and for the first four years of the course is altogether negligible; and that the marking in the elementary school seems, therefore, to be practically uniformly discriminative.

TABLE No. 1

The Group Averages

No. of Students	The Group	Average Grade
106	The Elementary School	89.15
104	First four years of Elementary School	89.16
106	The High School	82.49
106	Decline between Ele. School and High School	6.66
	Elementary School Subjects	
106	Spelling	91.33
106	Reading	90.80
106	Writing	89.47
106	Arithmetic	87.57
106	Grammar and Language	88.37
106	Geography	89.32
105	History	89.46
83	Physiology	88.26
105	Rhetoricals	91.96
101	Manual Training	87.55
106	Music	87.00
106	Drawing	89.38
	High School Subjects	
106	English	83.39
106	Mathematics	80.51
106	History	84.20
100	Foreign Language	81.53
99	Science	79.94
28	Drawing	86.92

There are so many subjects of study in the high school that for purposes of correlation certain of them were combined under comprehensive headings. (See Table No. 1.) All the marks in English Literature and English Grammar were combined to make up the average mark in English. In like manner Algebra, Geometry and Arithmetic were combined under the head of Mathematics; History and Civics under the head of History; Latin and German under the head of Foreign Language; and Physiography, Physiology, Botany, Zoölogy, Chemistry and Physics under the caption of Science.

(1) The Correlations: (a) The correlation between the average elementary and high school grades was worked out according to the Pearson formula and also by the method of quartiles. (See Table No. 2 and Figures 1 to 4.) (b) The Pearson coefficients for most of the possible correlations between specific subjects were obtained. (See Table No. 2.) Several of the same correlations between specific subjects were worked out by the quartile method. (See Figures 3 to 18.) (c) Fourteen of the group attended the State Univer-

sity of Iowa. The relative elementary school, high school and university rankings of these students are presented in Table No. 3.

(2) The Sex Factor: For the relative standing of boys and girls in the various subjects, see Table No. 4. The Figures 32 and 33 and Table No. 5 present facts regarding the distribution according to sex in the average elementary and high school ranking and in various representative subjects of study.

(3) Rates of Progress: In Figures 34 to 38 and in Table No. 6 are presented facts regarding skipping of grades and retardation in the elementary school; the grades in which this skipping and retardation most frequently occur; failures in the high school; and other minor details.

General Explanation of the Correlations

Two methods of correlation have been used, the Pearson method and the method of quartiles. The Pearson coefficients of correlation, as Professor Thorndike says, are obtained simply, though with much arithmetical work. by the formula $r = \frac{\Sigma \chi \cdot \gamma}{\eta \sigma_1 \sigma_2}$

Regarding the nature of this coefficient I take the liberty of quoting from Thorndike.[1] "It (the coefficient of correlation) has possible values from +100 per cent. through 0 to —100 per cent. A coefficient for correlation between two abilities of +100 per cent. means that the individual who is best in the group in one ability will be the best in the other; that if the individuals were ranged in order of excellence in the first ability and then in order of excellence in the second, the two rankings would be identical, that any one's station in the one will be identical with his station in the other. A coefficient of —100 per cent. would per contra mean that the best person in the one ability would be the worst in the other, that any degree of superiority in the one would go with an equal degree of inferiority in the other and *vice versa.* A coefficient of +62 per cent. would mean that (comparison being rendered fair here as always by reduction to the variabilities as units) any given station in the one trait would imply —62 hundredths of that station in the other." To illustrate let us take our own coefficients of correlation, +71, the coefficient found to exist between the average elementary and high school grades. This means, according to Thorndike's explanation, that any given station occupied by a pupil in the elementary school would imply 71 hundredths of that station in the high school distribution.

The method of quartiles, while much less exact, is useful in that it presents in a very simple way the essential relations and enables one to follow the fluctuation of the individual. Figures 1 and 2, for example, show the use of the quartile method. Figure 1 presents the ranking of the group in the elementary school course. There were five individuals who had an average elementary grade of 95, two who had an average elementary grade of 94 and so on until we come to the one who had an average grade of 80. In figuring out the averages there was usually a decimal, as, for example, number 1's real average elementary grade was 95.92. This decimal of .92 being the largest in the 95 column we place it at the top. In like manner we place each decimal relative to the other, the lowest at the bottom, the highest at the top, and so on with each column of grades.[1] Then beginning at the top of the 95 column we number down until we come to 106. This gives each one his number according to his relative rank in the group. These numbers based upon the elementary school work are retained throughout all the other figures, "1," for instance, in the other figures is thus the individual who attained 1st rank in the elementary school.

---

[1] *Educational Psychology,* page 26.

Figure 1 is next divided as nearly as possible into quartiles or four equal parts. On account of the number 106, the division had to be into groups of 27, 26, 27, 26. The quartiles are numbered from the right side. Quartile No. 1 is left as nearly white as possible and contains those 27 who were ranked highest; No. 2 is hatched with lines from the upper right-hand corner to the lower left, and contains the next 26 in order of rank; No. 3 is hatched in the opposite manner from 2, and contains the next 27; and No. 4 is black and contains the poorest 26 of the group.

Figure 2 is constructed in essentially the same manner as Figure 1, only that in place of numbering the individuals according to their rank in the high school group we put down, as stated above, the number which the individual received in the elementray school ranking. The individual, for example, who is first or received 95 in the high school work was second in the elementary ranking. We therefore place the number "2" in the 95 column in Figure 2. In like manner we take account of each one, always keeping the square white, hatched or black as the case may be, in the upper figure.

We are in this way able to see how many of the numbers found in the first quartile of Figure 1 are found in the first quartile of Figure 2, or how the individuals in the first quartile of Figure 1 distribute themselves among the quartiles of Figure 2, or to put it in other words from the standpoint of

---

[1] This method is followed strictly in Figure 2.

Figure 2, we are able to see in what quartiles of Figure 1 the individuals are found who make up quartile No. 1 of Figure 2.

If all the white squares were to appear in the first quartile of Figure 2 and so on until we found all the black squares of Figure 1 in the fourth quartile of Figure 2, the correlation would be perfect according to the quartile method. This, however, is seldom the case. One may look for the correlations, then, by noting the prominence of white, hatching or black in a quartile, but a more satisfactory way of exhibiting it is demonstrated in Figures 3 and 4, for example. In Figure 3, using the average elementary school grades as a basis,[1] we find that of the 27 in the first quartile there are 18 who are found in the first quartile in the average high school grades, 7 who descend to the second high school quartile, 1 to the third, and 1 to the fourth. In a similar way we show the high school distribution of the individuals who make up each of the elementary school quartiles. The white-faced numbers which form a diagonal line in Figure 3 indicate where we shoud expect to find any existing correlation. If this number is greater than any other in its line, as in Figure 3, 18 is greater than 7, 1, or 1, there is shown to be correlation, while the white-faced number 7 in Figure 3 indicates almost no correlation, for the other numbers are as large and practically represent chance distribution.

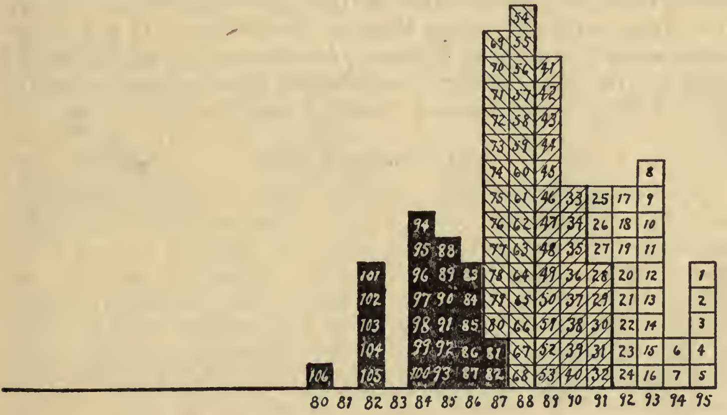


Fig. 1. The ranking of the group in their elementary school work. Quartiles numbering from right to left. The heavy lines indicate the quartile divisions.

The correlation by halves (see Figure 4) may be easily

---

[1] In such figures the caption at the left-hand side always indicates the grades which are used as the basis.

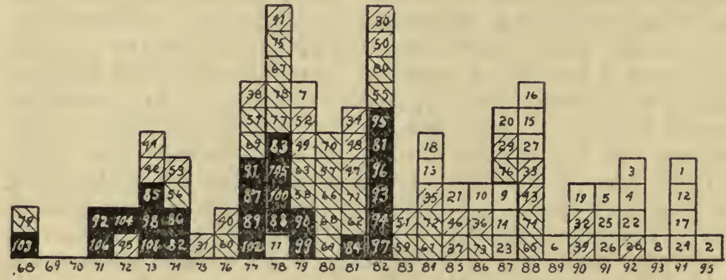


Fig. 2. The group according to the high school distribution.

worked out from Figure 3. The sum of the numbers in the four upper left-hand squares in Figure 3 is 38, of the upper right-hand squares it is 15 and so on. If the numbers in the upper left-hand square and in the lower right-hand square are larger than the others there is correlation. If the correlation were complete in Figure 3, in place of the 18 we should have 27, in place of the 7 we should have 26 and so forth, then in Figure 4 in place of each 38 would be 53.[1]

The Correlations

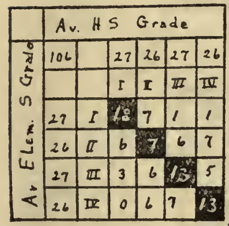
(a) The correlations between the average elementary school grade and the average high school grade is, according to both the Pearson formula and the method of quartiles, shown to be quite high.[2] We may, therefore, say that in general those pupils who are the best in the elementary school are also best in the high school, and that those who are poor in their elementary school work will likewise be poor in the high school.[3] No radical change is to be noted on the part of the average pupil as he passes from one school to another. There are, of course, some notable exceptions such as Nos. 7, 11, 31, 45 and 65 who make large jumps one way or the other but these only make the general conclusion stand out the more strikingly.

---

[1] It is possible to work out a coefficient of correlation from Figure 4, or the correlation by halves, as is shown by Mr. G. H. Mount of the University of Iowa in some unpublished manuscripts. The formula is $K = \frac{a-b}{n}$. To illustrate by Figure 4 $K = \frac{38-15}{53}$ or $\frac{76-30}{106} = .43$. The author knows of no relation between the coefficient thus obtained and the Pearson coefficient. It is obvious that the correlation so far as the quartile method is concerned could be perfect while the Pearson coefficient would be far from +1.00.

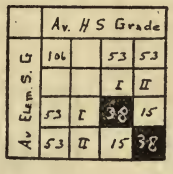
[2] Dearborn found that the Pearson coefficient of correlation between the average high school standing and the university standing was about +.80. Our coefficient of +.71 compares favorably with this.

[3] It will be noticed in Table No. 1 that between the group average elementary school grade and the group average high school grade there is a decline of 6.66 per cent. The Figures, Nos. 1 and 2, and 19 to 31, which compare elementary with high school grades, also show this decline in the lengthening of the high school curve or in other words in the scattering of the high school distribution among many more percentages. The first



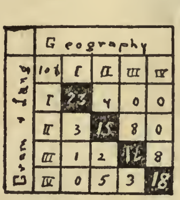
			Av. H S Grade			
Av. Elem. S Grade	106		27	26	27	26
			I	II	III	IV
	27	I	18	7	1	1
	26	II	6	7	6	7
	27	III	3	6	13	5
	26	IV	0	6	7	13

Fig. 3



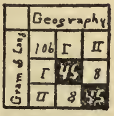
			Av. H S Grade	
Av. Elem. S. G	106		53	53
			I	II
	53	I	38	15
	53	II	15	38

Fig. 4



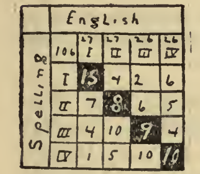
		Geography			
Gram. & Lang.	106	I	II	III	IV
	I	23	4	0	0
	II	3	15	8	0
	III	1	2	16	8
	IV	0	5	3	18

Fig 5



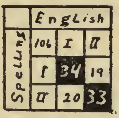
		Geography	
Gram. & Lang.	106	I	II
	I	45	8
	II	8	45

Fig 6



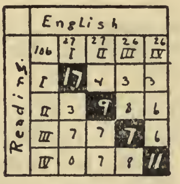
		English			
Spelling	106	27 I	27 II	26 III	26 IV
	I	15	4	2	6
	II	7	8	6	5
	III	4	10	9	4
	IV	1	5	10	10

Fig 7



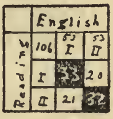
		English	
Spelling	106	I	II
	I	34	19
	II	20	33

Fig. 8



		English			
Reading	106	27 I	27 II	26 III	26 IV
	I	17	4	3	3
	II	3	9	8	6
	III	7	7	7	6
	IV	0	7	8	11

Fig. 9

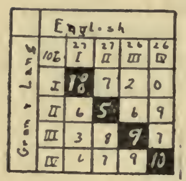


		English	
Reading	106	53 I	53 II
	I	33	20
	II	21	32

Fig. 10

quartile in Figure 2 includes the entire range of the first three quartiles of Figure 1, and quartile two in Figure 2 includes practically the range represented by quartile four in Figure 1. This means that in Figure 2, approximately but half of the total group comes within the whole range of Figure 1. If a pupil could make in the high school the same grade that he made in the elementary school his rank would, in many cases, be raised one or two quartiles. (See Figures 1 and 2, Nos. 39, 65 and 76.) This is not true, however, in the case of one that is in the first quartile in the elementary work. All that such an individual can do is, of course, to obtain a rank nearer the head of his quartile. (See Figures 1 and 2, Nos. 17 and 24.)

We must bear in mind that those individuals in the first and last quartiles can, so far as the quartile method is concerned, move in but one direction, while those in the two central divisions may move in either direction and thus effect a change which can be taken into account. Moreover the range of one of the central quartiles is usually less than that of the first or fourth quartile, so that a slight fluctuation in those sections more often means a change of quartile. These factors may account for the *slight* correlation which frequently exists in the central quartiles. (See Figures 3, 7, 9, and 11.)

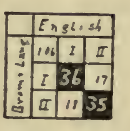


English

Gram. Lang

106	27 I	27 II	26 III	26 IV
I	18	7	2	0
II	6	5	6	9
III	3	8	9	7
IV	6	7	9	10

Fig 11

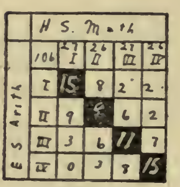


English

Gram. Lang

106	I	II
I	36	17
II	11	35

Fig 12

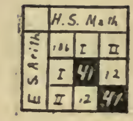


H S. Math

E S Arith

106	27 I	26 II	27 III	26 IV
I	15	8	2	2
II	9	8	6	2
III	3	6	11	7
IV	0	3	8	15

Fig 13

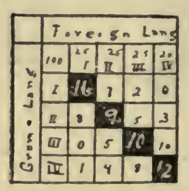


H.S. Math

E S Arith

106	I	II
I	41	12
II	12	41

Fig 14

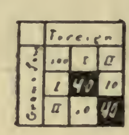


Foreign Lang

Gram. Lang

100	25 I	25 II	25 III	25 IV
I	16	7	2	0
II	8	9	5	3
III	0	5	10	10
IV	1	4	8	12

Fig 15

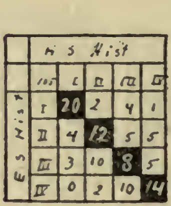


Foreign

Gram. Lang

100	I	II
I	40	10
II	10	40

Fig 16

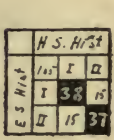


H S Hist

E S Hist

105	I	II	III	IV
I	20	2	4	1
II	4	12	5	5
III	3	10	8	5
IV	0	2	10	14

Fig 17



H S. Hist

E S Hist

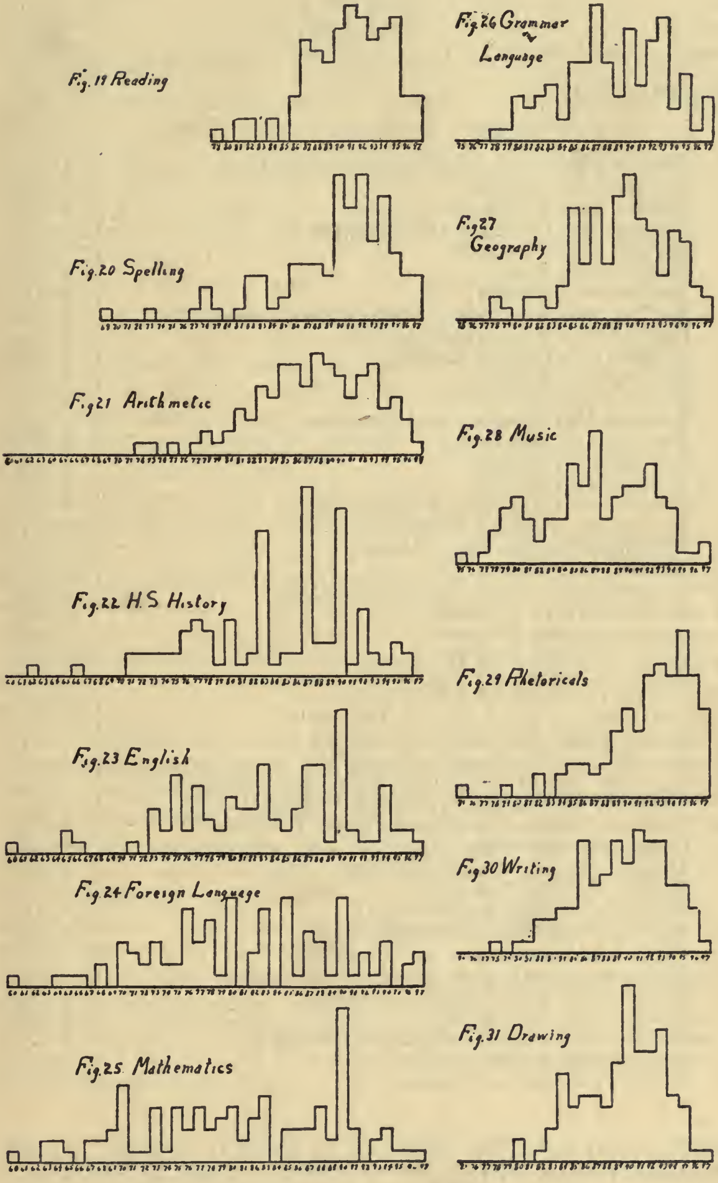
105	I	II
I	38	15
II	15	37

Fig 18

These figures show, 3 10 18, the results of a few representative cases of correlation by quartiles. The white numbers indicate the places where correlation occurs.

(b) The correlations between specific subjects are also quite high though usually less than that between the general averages. A careful comparison of these correlations brings out two or three important facts. It will be noticed that the coefficients of correlations for History with H. S. History and for Arithmetic with H. S. Mathematics are not so high as those for History and Geography, and Arithmetic with Grammar and Language. In other words the correlations between the same subjects in different schools are *not* markedly higher and many times are not so high as those between different subjects either in the same school or in different schools. This may argue a radical difference between the schools themselves; however, the author believes it to indicate more especially a general consistency in the rank of each pupil throughout the various subjects of study. In other words these coefficients would seem to show that if a pupil makes a good mark in one subject he will be quite apt to make good marks in all subjects, similarly the pupil who is poor in one subject will tend to be poor in all.

Upon close inspection of the coefficients of correlation it will be noted that, for example, the coefficients obtained from combinations of Spelling with other subjects are usually relatively low, while those obtained from correlations of Grammar and Language with various other subjects are quite uniformly high. The average coefficient for each subject in



Representative curves of distribution in various subjects.

TABLE No. 2

Correlations[1]

Subjects of Study	r
Ele. Av. Grade with High School Av. Grade	+.71
Spelling with Reading	+.54
Spelling with Arithmetic	+.51
Spelling with Grammar and Language	+.67
Spelling with Geography	+.55
Spelling with History	+.39
Spelling with English	+.35
Spelling with High School Mathematics	+.26
Spelling with High School History	+.36
Spelling with Foreign Language	+.59
Spelling with Science	+.17
Reading with Arithmetic	+.35
Reading with Grammar and Language	+.59
Reading with Geography	+.58
Reading with History	+.49
Reading with English	+.59
Reading with High School Mathematics	+.26
Reading with Foreign Language	+.30
Reading with High School History	+.43
Reading with Science	+.32
Arithmetic with Grammar and Language	+.67
Arithmetic with Geography	+.69
Arithmetic with History	+.43
Arithmetic with English	+.43
Arithmetic with High School Mathematics	+.62
Arithmetic with High School History	+.59
Grammar and Language with Geography	+.75
Grammar and Language with History	+.56
Grammar and Language with English	+.55
Grammar and Language with High School Mathematics	+.53
Grammar and Language with High School History	+.46
Grammar and Language with Foreign Language	+.61
Geography with History	+.74
History with High School History	+.61
English with Mathematics	+.61
English with High School History	+.61
English with Foreign Language	+.57
English with Science	+.66
Mathematics with High School History	+.69
Mathematics with Foreign Language	+.64
Mathematics with Science	+.58
History with Foreign Language Language	+.58
History with Science	+.64
Foreign Language with Science	+.60

combination with the others is as follows: Spelling + .439, Reading + .445, Arithmetic + .536, Grammar and Language

---

[1] According to the Pearson Method.

+ .59, History + .536, Geography + .662, English + .546, Mathematics + .524, High School History + .552, Foreign Language + .556 and Science + .495. According to these figures we may say that if one wished to select the grade in a single subject which would be most representative of the individual's general school standing we should take the grade in Geography. The grade which would be least representative of the individual's general standing is the one in Spelling. To make such subjects as Reading or Arithmetic the basis of promotion from grade to grade would thus be manifestly unfair.

Another point to be noted is the difference between the coefficients of correlation where (1) an elementary subject has been correlated with a high school subject and where (2) an elementary subject has been correlated with an elementary subject or a high school subject with a high school subject. There are twenty-five cases of the latter sort. The average of these twenty-five coefficients is + .588. There are eighteen cases where correlations have been made between some elementary subject and some high school subject. The average of these coefficients is + .446. Fifteen coefficients were obtained by correlating elementary school subjects. Their average coefficient is + .567. Ten correlations were made between high school subjects with an average coefficient of + .618. These figures would seem to indicate a difference between schools, as well as showing that correlation is higher between high school subjects than it is between elementary school subjects.

(c) Fourteen from our group of 106 took work in the State University of Iowa after graduating from high school. The average elementary, high school and university grades of these individuals are presented in Table 3. The most striking thing about this table is that the pupils who rank first and last in the elementary and high school standings, also rank first and last respectively in university standing, so far as this group is concerned. There is also marked correlation in case of numbers 4 and 12. Below the table the correlation is indicated by the method of halves, the first seven according to the elementary school ranking, contain six of the first seven according to the university ranking. The high school ranks are seen to correlate with those of the university better than do those of the elementary school.

THE SEX FACTOR

In the gathering of data there was no effort made to obtain records of an equal number of boys and girls. But after the resources were exhausted it was discovered that we had just

Table No. 3

Ranking of Fourteen of the Students who attended the State University of Iowa

Ele. S. Ranking	Ele. S. Number[1]	H. S. Ranking	H. S. Number[1]	Univ. Ranking	Ele.S. Av. Grade	H. S. Av. Grade	Univ. Av. Grade
1	12	1	3	1	94	95	89
2	18	7	38	9	93	85	79
3	21	6	34	12	92	86	73
4	25	4	12	5	92	92	85
5	26	3	11	4	92	92	87
6	28	2	9	2	92	92	88
7	47	10	59	11	90	81	74
8	65	55	23	2	88	88	88
9	77	11	77	5	87	79	85
10	80	8	44	5	87	83	85
11	88	10	80	10	86	78	75
12	91	13	86	13	85	77	69
13	93	9	49	5	85	82	85
14	104	14	101	14	82	73	63

E. S. Rank	H. S. Rank		Univ. Rank		
	6	1	4	3	
	1	6	3	4	

H.S. Rank	Univ. Rank		
	5	2	
	2	5	

53 boys and 53 girls in the group. This makes it convenient for comparing the ranking of each sex.

In Figures 32 and 33 the black squares represent boys while the white represents girls. These figures show the distribution according to sex in the elementary and high schools respectively. An inspection of the topmost portion of Table No. 5 will make explicit what is shown in the two previous figures. It will be noted that the first 27 of the elementary school group is composed of 22 girls and 5 boys, the next 26 of 15 girls and 11 boys, the next 27 of 10 girls and 17 boys, while the last 26 contains 6 girls and 20 boys. In the elementary school the girls are decidedly ahead of the boys and, while the difference in the high school is not so great, yet even here the girls are in the lead.

Not only do the girls lead the boys, when we figure on the basis of the general average ranking, but this is also the case in most, if not all, of the specific subjects of study. (See

---

[1] These numbers indicate rankings in the larger group of 106.

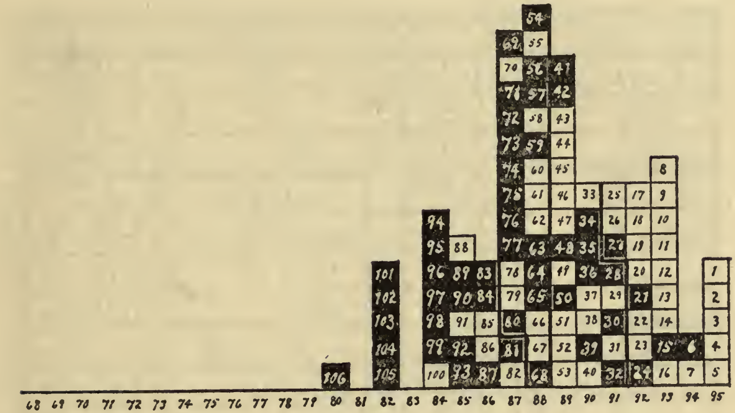


Fig. 32. The distribution of boys and girls in the average elementary school rank. (Black represents boys.)

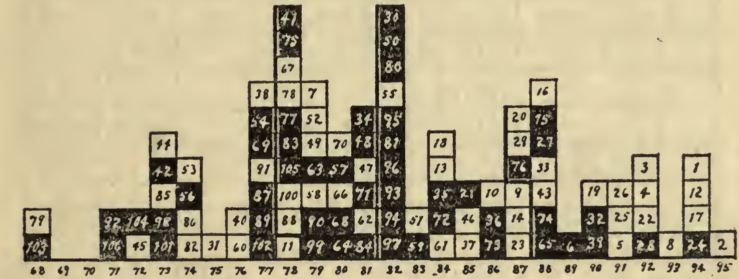
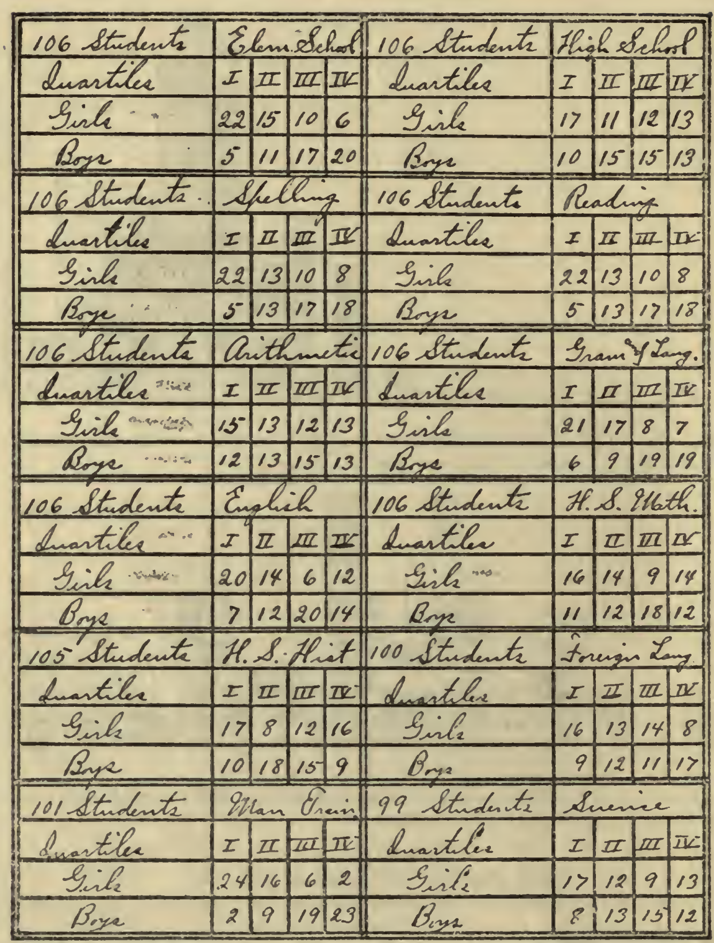


Fig. 33. The distribution of boys and girls in the average high school ranking. (Black represents boys.)

TABLE NO. 4

Group Averages for Boys and Girls

Subjects of Study	Grade Boys	 Girls
Elementary School	87.64	90.66
High School	81.47	83.51
Spelling	88.00	84.30
Reading	89.40	92.00
Arithmetic	87.60	87.60
Grammar and Language	87.00	90.20
Geography	88.80	89.80
History	89.40	89.50
Manual Training	84.60	90.80
English	81.20	85.60
Mathematics	79.70	81.30
High School History	84.30	84.10
Foreign Language	80.00	83.10
Science	79.00	81.00



106 Students	Elem. School				106 Students	High School			
Quartiles	I	II	III	IV	Quartiles	I	II	III	IV
Girls	22	15	10	6	Girls	17	11	12	13
Boys	5	11	17	20	Boys	10	15	15	13
106 Students	Spelling				106 Students	Reading			
Quartiles	I	II	III	IV	Quartiles	I	II	III	IV
Girls	22	13	10	8	Girls	22	13	10	8
Boys	5	13	17	18	Boys	5	13	17	18
106 Students	Arithmetic				106 Students	Gram. of Lang.			
Quartiles	I	II	III	IV	Quartiles	I	II	III	IV
Girls	15	13	12	13	Girls	21	17	8	7
Boys	12	13	15	13	Boys	6	9	19	19
106 Students	English				106 Students	H. S. Math.			
Quartiles	I	II	III	IV	Quartiles	I	II	III	IV
Girls	20	14	6	12	Girls	16	14	9	14
Boys	7	12	20	14	Boys	11	12	18	12
105 Students	H. S. Hist				100 Students	Foreign Lang.			
Quartiles	I	II	III	IV	Quartiles	I	II	III	IV
Girls	17	8	12	16	Girls	16	13	14	8
Boys	10	18	15	9	Boys	9	12	11	17
101 Students	Man. Train				99 Students	Science			
Quartiles	I	II	III	IV	Quartiles	I	II	III	IV
Girls	24	16	6	2	Girls	17	12	9	13
Boys	2	9	19	23	Boys	8	13	15	12

Table No. 5. Indicating the relative number of boys and girls in the various quartiles in the elementary and high school rankings and in representative subjects.

Tables Nos. 4 and 5.) The distribution in the case of Arithmetic is about as even and as nearly in favor of the boys as anywhere.

The Manual Training grades were something of a surprise from the standpoint of the sex factor. Granting that the division lines for the quartiles, in this subject, were arbitrary, yet in the best 43 of this Manual Training group there are only 6 boys. The total number of boys (53) took Manual Training while only 48 of the girls had grades in this subject. A thing that will be noticed in several subjects is that the girls have a majority in the first and fourth quartiles while the boys predominate in the two middle quartiles. This may account for the fact that in one or two instances the boys attained a higher average grade than the girls. (See Table No. 4.) It may be noted from this table that in passing from the elementary school to the high school the boys came nearer than the girls to holding their own in average grade.

Why the girls should thus out-class the boys is a hard question to answer. Possibly it is because the girls are more fully developed than the boys or are more conscientious about following the directions of instructors. Then again it may be that the schools do not vitally appeal to the real abilities of the boys.

Rates of Progress

Out of the group of 106 individuals the records indicate that 52, during the elementary school course, skipped a half-year or more of the work. (See Figure 34.) The black squares represent those who thus skipped grades. In no case was skipping counted if it occurred in the first grade, furthermore if, for example, a pupil skipped a half-grade and then later in his course repeated as much, which often happened, neither the skipping nor the repeating was counted.

Altogether there were 102 half-grades skipped in this manner. Of this number 68 cases occur between B Second and B Fifth, while there are 34 cases between A Fifth and A Eighth. (See Figure 38.) The skipping distributed according to the final average marks of those who did it is presented in Figure 37. (The hatching indicates the amount of retardation.) When we take into consideration also the fact that on the average the pupils who skip grades are eight months younger upon graduation than their fellows it is evident that they have in this way really gained some time.

These results are quite the contrary of those attained by Ayres.[1] I have taken the liberty to reproduce in Figure 39 a diagram by which Ayres contrasts the number of pupils making rapid progress with those making slow progress. Judging from the results shown in Ayres's figure it is difficult to account for the rapid progress of nearly one-half of the group which we have studied. To some extent ours is a selected group, to what extent one cannot tell.[2]

---

[1] *Cf.* *"Laggards in Our Schools."* Chap. 7.

[2] The teachers in the Iowa City Schools were much surprised to learn of the amount of skipping but offered no explanation.

There were 28 of the boys and 24 of the girls who made rapid progress in the elementary school, while 4 of each sex were retarded in these grades. The boys skipped 48 half-grades, the majority of which were between B Second and B Fifth, while of the 54 half-grades omitted by the girls almost half were between A Fifth and A Eighth.

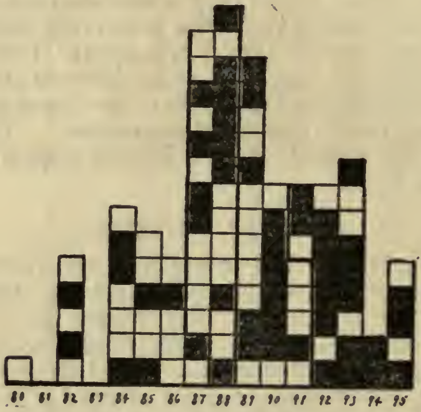


Fig. No. 34. The distribution of those who skipped grades in the elementary school indicated by the black.

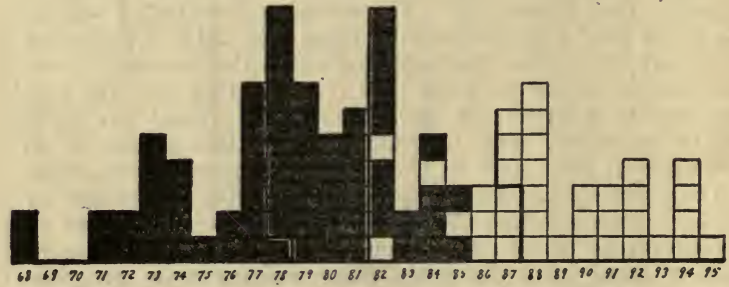


Fig. No. 35. The distribution of those students who had one or more "Fs" in the course of their high school work indicated by the black.

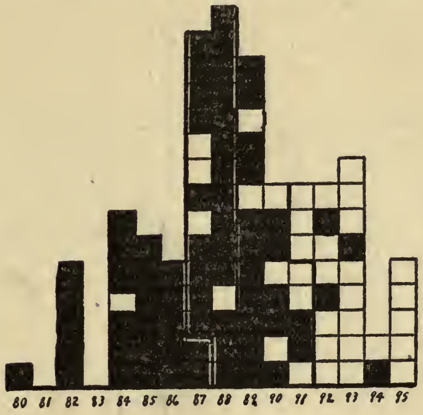


Fig. No. 36. The distribution in the elementary school ranking of those who received one or more "Fs" in their high school work indicated by the black.

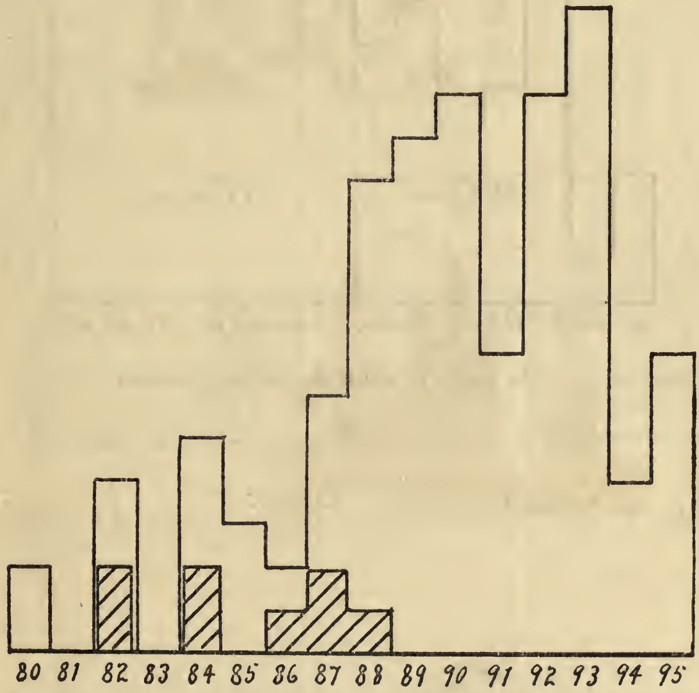


Fig. No. 37. The distribution of the 102 half-grades skipped, according to the final average mark of those who did the skipping.

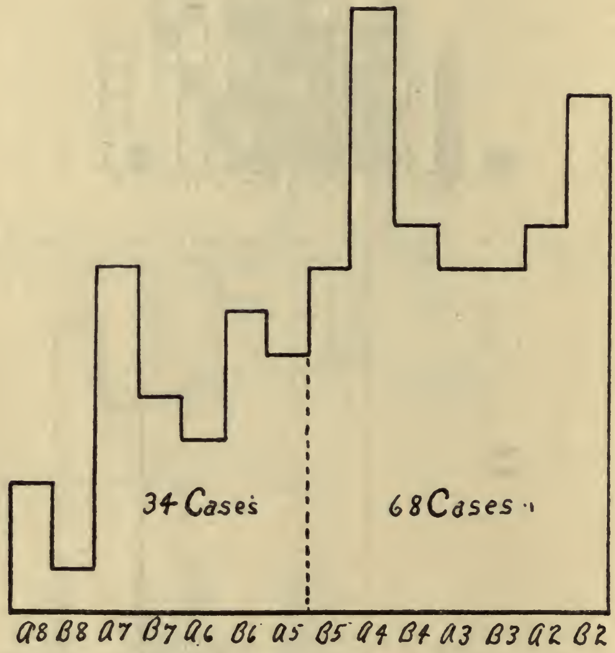
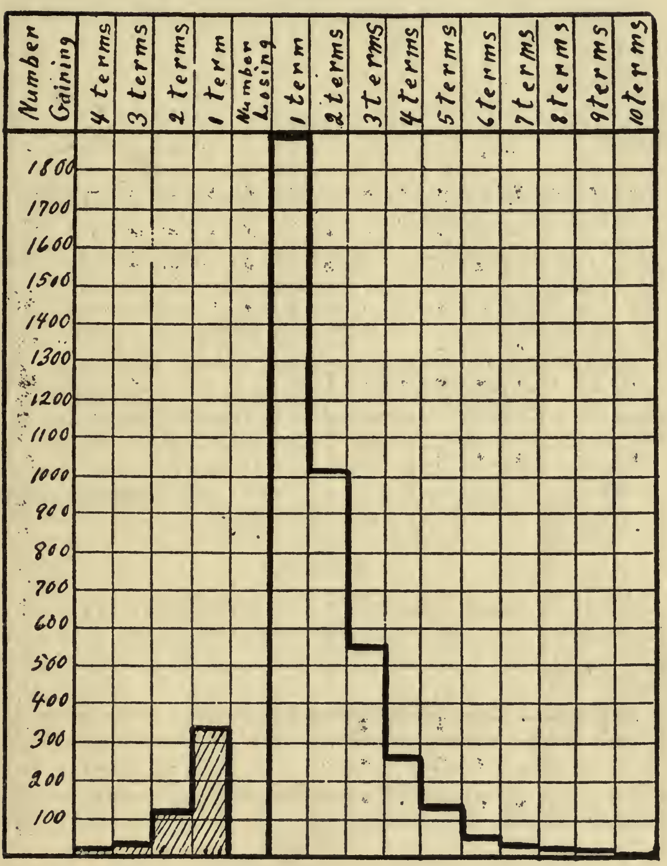


Fig. No. 38. The grades in which the skipping occurred.



Rates of Progress According to Ayres

Fig. 39. Borrowed from "Laggards in Our Schools," Ayres. The hatching indicates those making rapid progress.

The failures in the high school amount to 300 for the whole group. By failure here we mean unsatisfactory work in some subject for a semester. Many of the students had one or two F's while No. 106 had seventeen to his discredit. There were 170 failures among 39 boys while 30 girls made the remaining 130 failures. In Figure 35 the black squares indicate the high school distribution of those who had failures. Figure 36 shows the distribution of these same individuals in the elementary school. The number of failures occurring in each of the high school subjects is shown in Table No. 6. There is thus shown to be a marked correlation between one's position in the elementary school group, and the probability of his making "F's" during his high school course.

Subjects	Total number of marks in subject	Total number of failures in subject	Per cent. of marks that were failures
English	640	60	9
Mathematics	573	111	19
History	388	26	7
Foreign Language	496	69	14
Science	267	34	13

Table No. 6 indicates the percentage of marks that were failures in the various high school subjects.

SUMMARY

Our study would, therefore, seem to point to the following conclusions: the great majority of the students who take the high school course have made rapid or at least normal progress in the elementary grades; most of the high school students fail in some of their work; the schools seem to be fitted better for girls than for boys; the individual student in passing from the elementary school to the high school seldom changes radically his ranking and the rank which he receives in any one subject will represent nearly the rank which he receives in all subjects.

①

Obtainable from the University
Editor Price, $0.75

RETURN TO the circulation desk of any
University of California Library

or to the

NORTHERN REGIONAL LIBRARY FACILITY
Bldg. 400, Richmond Field Station
University of California
Richmond, CA 94804-4698

ALL BOOKS MAY BE RECALLED AFTER 7 DAYS

- 2-month loans may be renewed by calling (510) 642-6753
- 1-year loans may be recharged by bringing books to NRLF
- Renewals and recharges may be made 4 days prior to due date

DUE AS STAMPED BELOW

SEP 0 5 2003

SEP 2 4 2003

OCT 1 7 2003

DD20 15M 4-02

RY
209
NLY
LEY

U.C. BERKELEY LIBRARIES
C029341655

640514

UNIVERSITY OF CALIFORNIA LIBRARY
EDUC.
LIBRARY